THE PLANT DISEASE REPORTER

Issued By

THE PLANT DISEASE SURVEY

Division of Mycology and Disease Survey
BUREAU OF PLANT INDUSTRY, SOILS, AND AGRICULTURAL ENGINEERING
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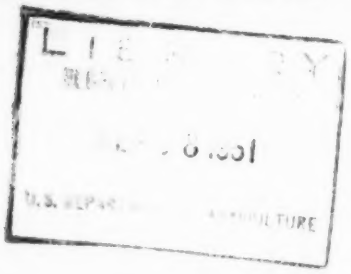

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The Plant Disease Reporter is issued as a service to plant pathologists throughout the United States. It contains reports, summaries, observations, and comments submitted voluntarily by qualified observers. These reports often are in the form of suggestions, queries, and opinions, frequently purely tentative, offered for consideration or discussion rather than as matters of established fact. In accepting and publishing this material the Division of Mycology and Disease Survey serves merely as an informational clearing house. It does not assume responsibility for the subject matter.

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THE PLANT DISEASE SURVEY
DIVISION OF MYCOLOGY AND DISEASE SURVEY

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COMPARISON OF ACTIDIONE WITH SOME OTHER SPRAY CHEMICALS FOR CONTROL OF CHERRY LEAF SPOT IN MICHIGAN

Thomas T. McClure and Donald Cation

In July of 1950, an outbreak of cherry leaf spot infection in a one-year old nursery and in two other plots of closely planted sour cherry trees resulted from two inadequately timed sprays of 341 SC. This gave ideal conditions to compare several spray materials in East Lansing.

Three plots of trees were used. In two plots a single application only of several test materials was made and in the third plot several combination applications were compared. As different treatments were used in the several plots, it was not possible to make a complete evaluation of all the materials, but the final analysis showed outstanding results from the use of Actidione. As Actidione has been tried only once previously for the control of cherry leaf spot, it is believed that a report of the data, such as they are, should be of interest to investigators of leaf spot control.

Plot I contained five-year-old cherry trees planted 6 feet apart in two rows separated by 10 feet and therefore growing under crowded conditions. Each treatment was applied to 10 trees in two replications of 5 trees each, with the exception of 341 SC which was not replicated. The results are presented in Table 1.

The defoliation of trees sprayed with Bordeaux resulted largely from copper injury and not from further infection, which was held to a minimum. The trees sprayed with different concentrations of Actidione were comparable for about two weeks following the one application, but subsequently those with an application of 1/2 ppm showed more infection and defoliation than those sprayed with the stronger concentrations. On September 20, the difference in defoliation between 1 ppm and 5 ppm applications were negligible, but the 5 ppm application had fewer active lesions. In Figure 1 trees sprayed with Actidione 1 ppm are compared with control trees.

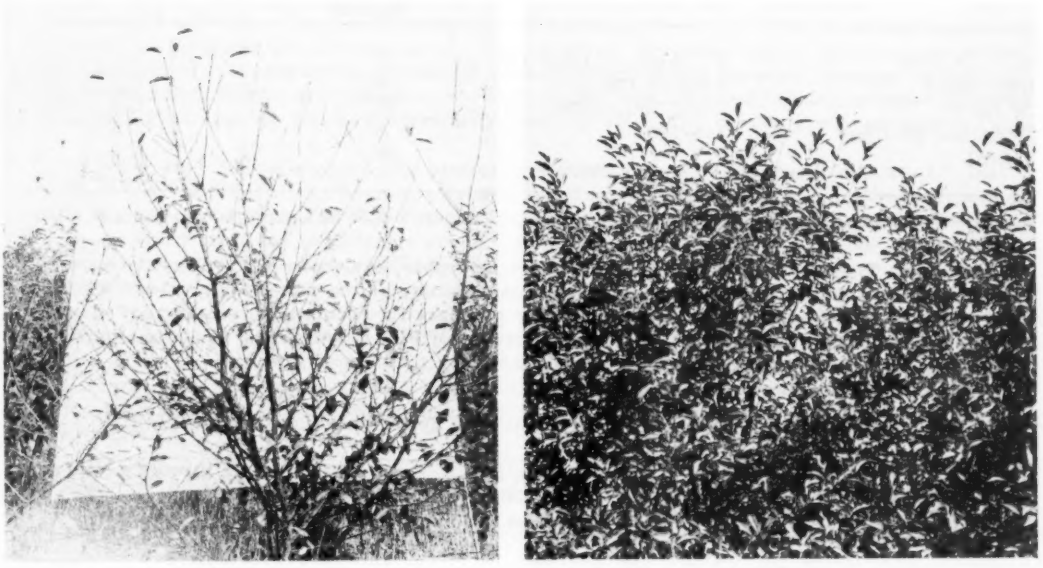

FIGURE 1. Appearance on September 20 of sour cherry trees in Plot I. Left: control tree showing severe defoliation. Right: trees sprayed with Actidione, 1 ppm.

Table 1. Comparative effectiveness of spray materials in Plot I, following one application made on June 14.

Materials	Concentration	Defoliation September 20 Percent	Leaf Spot rating [a]
1. Actidione	5 ppm	13	1.5
2. Actidione	1 ppm	15	2.5
3. Actidione	1/2 ppm	76	4.0
4. Bordeaux	3-5-100	19	1.0
5. 341 SC & lime [b]	1 1/2 qts. - 1/2 - 100	24	2.0
6. Em [c]	1 qt. - 100	44	3.5
7. 1124 [c]	3 lbs. - 100	83	3.5
8. 1189 [c]	4 lbs. - 100	96	3.5
9. Control		93	3.0

[a] rating: range, 0-4: 0 = no leaf spot, 4 = severe leaf spot

[b] not replicated

[c] Em, 1124 and 1189 were experimental compounds furnished by the General Chemical Company.

Remarks: On July 14 when the spray materials were applied the trees appeared uniformly infected with leaf spot, but little defoliation or leaf yellowing had occurred.

Table 2. Comparative effectiveness of spray materials in Plot II, following one application made on June 22.

Materials	Concentration	Defoliation September 20 Percent	Leaf Spot rating
341 SC & lime	1 1/2 qts. - 1/2 - 100	3	1.0
Ortho 406 [a]	2 lbs. - 100	4	1.5
CR 305 [a]	1 1/2 lbs. - 100	17	1.5
Tennessee 26-lime	3-3-100	9	1.0
Control		90	4.0

[a] Ortho 406 supplied by California Spray Chemical Company, CR 305 supplied by Rohm & Haas Company.

Remarks: The treatments in Plot II are not comparable with those in Plot I as the spray was applied at a different date (July 22) and different epidemiological conditions prevailed. The trees in this plot had fewer established lesions when the comparative treatments were made. Less leaf spot was evident on the controls in Plot II than on those of Plot I. All of the materials gave good control of leaf spot as compared to the untreated checks.

Table 3. Comparative effectiveness of spray materials applied on August 25 in Plot III.

Material	Concentration	Defoliation Sept. 20 Percent	Leaf spot rating	Powdery Mildew Sept. 19 rating	Powdery Mildew Sept. 22 rating
341 SC - lime	1 1/2 qts. - 1/2 - 100	72	3	heavy	severe
Actidione	2 ppm	16	1	none	trace
Bordeaux	3-5-100	32	2	trace	slight

Remarks: The Actidione sprayed trees were outstanding for their freedom from leaf spot, lack of defoliation and for the soft texture of the leaves as compared with the Bordeaux sprayed trees. Incidental to the planned experiment it was noted that Actidione was also outstanding in retarding powdery mildew infection. Trees sprayed with Actidione and 341 SC are shown in Figure 2.

FIGURE 2. Appearance on September 20 of sour cherry trees in Plot III. Left: trees sprayed with Actidione 2 ppm. Right: trees sprayed with 341 SC, showing loss of lower leaves.

Plot II contained five-year-old trees planted 6 feet apart in rows 10 feet apart. Two replications of 5 trees each were used for each treatment. The results are presented in Table 2.

Plot III consisted of two blocks of yearling nursery trees, planted approximately 8 inches apart in rows 3 1/2 feet wide. A roadway of 12 feet separated the two blocks. One of the blocks was planted with Montmorency variety and the other with sweet cherry varieties.

On July 8 all of the trees were sprayed with Actidione at 4 ppm. This treatment apparently killed out the fungus in the active lesions. By August 25, six weeks later, it was apparent that new infections of leaf spot were established uniformly throughout the plot. Another spray was indicated and both blocks were divided into three parts: one received 341 SC, another received Actidione 2 ppm, and the third received Bordeaux 3-3-100. The results are presented in Table 3.

Conclusions: These experiments confirm the observations of Petersen and Cation[1] that Actidione has exceptional qualities as a foliage spray for sour cherries with further indications that it has similar qualities for sweet cherry foliage. Observations indicated that the control of leaf spot results from the eradicative properties of Actidione. Its value as a lasting protectant was not determined. The results obtained in these tests indicate that Actidione merits further investigation as a cherry spray. The minimal effective concentration for control of cherry leaf spot appears to be one part per million. The copper materials appeared outstanding for control of leaf spot although considerable injury was noticeable. It was apparent that 341 SC was not a reliable eradicant and is of doubtful value as a protectant when long intervals elapse between spray applications. One month after application, it did not protect against powdery mildew. The organic materials 341 SC, Ortho 406 and CR 305 gave satisfactory control under the conditions of one experiment.

MICHIGAN STATE COLLEGE, EAST LANSING

[1]Petersen, D., and D. Cation. Exploratory experiments on the use of Actidione for the control of peach brown rot and cherry leaf spot. Plant Dis. Reptr. 34: 5-6. 1950.

FURTHER OBSERVATIONS ON SOME CUCURBIT VIRUSES FROM CENTRAL FLORIDA[1]

C. W. Anderson

Doolittle (3), Wellman (4), and others have reported virus diseases of various crops in Florida. Among the most important of these is the Southern celery mosaic strain of cucumber mosaic which Wellman (4) found to be the cause of considerable loss in celery and other crops in this State. Recently, viruses have been considered especially important in peppers and cucurbits in central Florida. Anderson (1) reported the occurrence of three virus entities infectious to cucurbits from this area. Two of these were identified as cucumber mosaic strains; the third was given the common name "southern squash mosaic" pending further work on its possible relationships to other cucurbit viruses. This paper presents further evidence on the relationship of southern squash mosaic to cucumber mosaic strains, the identity of Florida cucumber mosaic strains, and the identification of Florida cucumber mosaic strains in pepper.

VIRUSES USED: Two strains of cucumber mosaic virus from central Florida, previously referred to as "virus 1" and "virus 2", and here called V1 and V2, respectively; cucumber mosaic virus, indicator strain (Marmor cucumeris var. judicis H.), which causes primary lesions in zinnia, kindly supplied by W. C. Price; a tobacco mosaic virus strain from Florida, identified by its typical reactions on tobacco, Nicotiana glutinosa, and tomato and by failure to infect cucumber; and southern squash mosaic virus (1) were used in these studies.

CROSS PROTECTION IN ZINNIA: Zinnia plants inoculated with the indicator strain of cucumber mosaic virus 18 days after they had been infected with V1 or V2 developed zero and 4 lesions, respectively. Moreover, the 4 necrotic lesions all occurred on a single leaf that showed no mottle symptoms of V2. Comparable control leaves produced 244 and 259 lesions, respectively. The data show that V1 and V2 protect zinnia plants from infection with the indicator strain of cucumber mosaic virus.

CROSS PROTECTION IN CUCURBITS: Anderson (1) reported that the presence of southern squash mosaic virus in watermelon plants reduced the number of primary lesions induced by inoculation with V1 by 88 percent, but tnat the presence of V1 in cucumber plants did not prevent systemic invasion by southern squash mosaic virus. The report is supported in part by results of 5 separate tests carried out in the following way: Watermelon plants were infected with southern squash mosaic virus by mechanical inoculation of their cotyledons. Neither the cotyledons nor the first two leaves showed striking symptoms of southern squash mosaic, but the second leaf usually displayed mild vein clearing and, sometimes, a mild downward curling and slight stunting. Sixteen days later, V1 was inoculated into both the cotyledons and the first two leaves. The numbers of lesions produced by the challenge inoculation in 17 test plants and 17 control plants are summarized in Table 1. Lesions were counted 10 days after the challenge inoculation.

Table 1. Reduction in numbers of local lesions produced by cucumber mosaic virus strain V1 in watermelon cotyledons and leaves as a result of previous invasion by southern squash mosaic virus.

	Number of lesions		
	Cotyledons	First Leaf	Second Leaf
Test plants	53	5	11
Controls	73	167	83
Percent reduction	27	97	87

[1]Florida Agricultural Experiment Station Journal Series No. 18.

The data show that the presence of southern squash mosaic virus caused a real reduction in the number of lesions induced by the challenge inoculation in the first and second leaves, and possibly in the cotyledons also, of Cannon Ball watermelon plants.

The previously mentioned report is also supported in part by results of the following experiment.

The V1 cucumber mosaic virus strain was inoculated into Early Green Market cucumber cotyledons. Twenty days later southern squash mosaic virus was inoculated into the fully mottled second and third leaves. Seventeen days after this inoculum from the fourth and later leaves of each cucumber plant was introduced into the cotyledons of each of two healthy watermelon seedlings. Symptoms of V1 infection appeared in none of 28 watermelon plants inoculated with sap from cucumber plants inoculated with southern squash mosaic only, but did appear in 27 of 28 watermelon plants inoculated with sap from cucumber plants inoculated with both viruses. Definite symptoms of southern squash mosaic appeared in 23 of 27 watermelon plants inoculated with sap from cucumber plants containing this virus only. Of 28 watermelon plants inoculated with sap from cucumber plants inoculated with both viruses, the dark green vein banding and blistering mosaic of southern squash mosaic developed in 7 of 12 plants which were not severely injured by V1. Mild vein clearing seemed present in 5 of the remaining 16 plants before they became so severely injured by V1 that they were unreadable for southern squash mosaic symptoms.

SIMULTANEOUS INFECTIONS IN CUCURBITS: Sap from southern squash mosaic-infected squash plants was mixed with an equal volume of sap from V1-infected plants and introduced into watermelon and cucumber plants. Control inoculum consisted of a mixture of equal parts of V1 inoculum and healthy squash juice. All plants were held for 30 days after inoculation unless they died earlier. The mixed inoculum caused 193 necrotic primary lesions on the cotyledons of 12 watermelon plants; control inoculum induced 186 such lesions. As a result of V1 infection, many plants of both groups showed necrosis of the hypocotyl, basal part of the stem, and petioles of the lower leaves, and some plants of both groups also showed chlorotic (and often later necrotic) spots and/or streaks in their leaves, particularly along the veins. Mild vein clearing and the dark green vein-banding-and-blistering mosaic symptoms of southern squash mosaic appeared in 5 of 8 watermelon plants inoculated with the mixed inoculum and not too severely injured by V1 to be readable for southern squash mosaic, but did not appear in 11 readable controls.

In general, cucumber plants inoculated with the mixed inoculum developed somewhat stronger mottling symptoms, were slightly more stunted, and more often died soon after inoculation than the controls, but the differences were not great. However, it was found that V1 primary lesions appeared earlier and became necrotic more quickly in watermelon seedlings inoculated with sap from cucumber plants previously inoculated with the mixed inoculum than in those inoculated with sap from cucumber plants previously inoculated with the control inoculum. The combined-inoculum-inoculated watermelon plants also showed more severe symptoms of V1 infection in other ways, and when final lesion counts were made 10 days after the final inoculations, the combined-inoculum plants averaged 9.7 lesions per cotyledon while the controls averaged only 4.7 per cotyledon. None of 13 readable control watermelon plants showed southern squash mosaic symptoms, but 7 of 7 combined-inoculum plants did.

RECOVERY OF V1 AND V2 FROM PEPPER: When sap from V1-infected California Wonder pepper plants was used as a source of inoculum, 11 of 15 pepper plants but none of 15 cucumber plants became infected with V1. In similar trials, using sap from V2-infected pepper, 15 of 15 pepper plants but only 5 of 15 cucumber plants became infected.

CROSS PROTECTION IN PEPPER: V2 inoculum was used to infect pepper seedlings with cucumber mosaic virus, and 18 or more days later the same plants plus an equal number of healthy control plants were inoculated with either V1 or tobacco mosaic virus. The V2 cucumber mosaic virus strain caused only a mild mottle and stunting in California Wonder pepper; the V1 strain and tobacco mosaic virus caused somewhat dissimilar but rather severe types of mottling in pepper, and both caused dropping of the inoculated or other leaves, necrotic streaking of the stem, and under some conditions, death of the shoot tips or of the entire plant.

Pepper plants already infected by the V2 cucumber mosaic virus strain developed dropping of inoculated and of some uninoculated leaves, necrotic stem streaks in most cases, and other less definite symptoms from the later tobacco mosaic virus inoculations. Usually, they required slightly longer for development of tobacco mosaic symptoms than did their controls, but the difference was not great. The V2-infected pepper plants showed no symptom changes as the result of later V1 inoculations.

DISCUSSION AND CONCLUSIONS: Cross protection tests between the V1 and V2 isolates (1) and the indicator strain of cucumber mosaic virus confirmed the identity of the former as strains of cucumber mosaic virus. Tests involving the V1 strain and southern squash mosaic virus in cucumber and watermelon plants are best interpreted as indicating that cucumber mosaic and southern squash mosaic viruses are distinct, despite the partial cross protection previously reported and confirmed here, for the following reasons: (1) Infection of cucumber or watermelon plants by both viruses caused a somewhat more severe disease than was caused by either virus alone; (2) necrotic primary lesions were more numerous and developed more rapidly on watermelon plants inoculated with sap from cucumber plants infected with both viruses than on watermelon plants inoculated with sap from cucumber plants infected with cucumber mosaic virus strain V1 alone; (3) no evidence was obtained that cucumber mosaic virus tends to predominate over southern squash mosaic virus, or vice versa, either in cucumber or in watermelon plants. An additive effect such as noted in reasons 1-2 above would not be expected if related strains of one virus were involved, but might be expected if two distinct viruses were present. Such an effect could then occur either from the additive effect produced by the two viruses on the physiology of the host, or by a mechanism in which the presence of a second virus changed the mechanism controlling virus concentration in such a way as to allow the first to build up a higher virus concentration in the host plant, as reported by Bennett (2) for dodder latent mosaic in the presence of tobacco etch or tobacco mosaic.

Although symptoms of southern squash mosaic differ from those of cucumber mosaic in such hosts as cucumber and squash, results of greenhouse tests with cucumber reported herein indicate that plants infected with both viruses cannot be adequately distinguished from those infected with cucumber mosaic alone, on the basis of symptoms observed in cucumber.

Failure to obtain high percentages of transmission of V1 and V2 strains of cucumber mosaic virus from pepper to cucumber, even though both were readily transmitted from pepper to pepper, emphasizes the difficulties that will be encountered in obtaining a simple method of identifying cucumber mosaic strains in pepper. Protection afforded by cucumber mosaic virus strain V2 against the V1 strain in pepper may be of some help in this respect, but further work is needed before its value can be determined.

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FLORIDA AGRICULTURAL EXPERIMENT STATION, GAINESVILLE

DOWNY MILDEW RESISTANT STRAINS OF WATERMELON FROM THE DOMINICAN REPUBLIC, WEST INDIES

G. K. Parris[1]

In February 1948 small packets of seeds of native watermelons were received at Leesburg, Florida, from Mr. George H. Hamor of Barahona, Dominican Republic, West Indies. He, a longtime resisent of the West Indian republic, has a keen interest in watermelon culture in the tropics. Commercial watermelons are sent to Mr. Hamor year after year for trial, through the Kilgore Seed Company, of Plant City, Florida, and its field representative Doctor Henry Schneck. Uniformly these northern kinds of melons have died, or borne fruit of low quality when planted in Barahona.

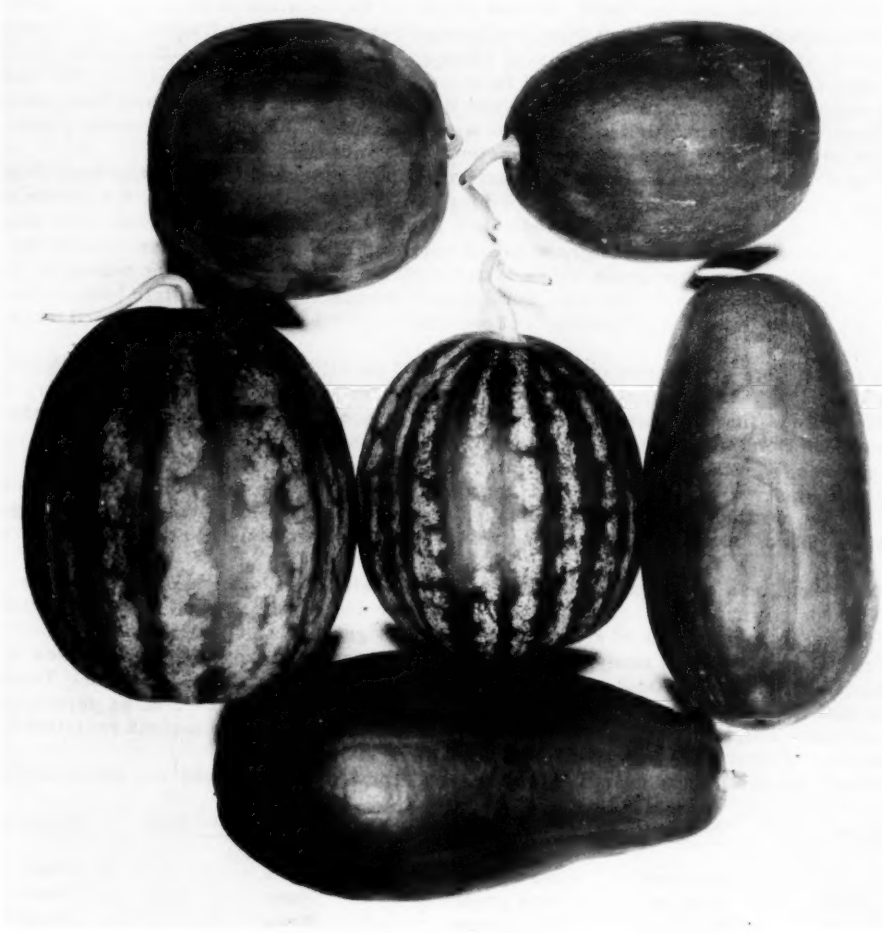

FIGURE 1. Representative fruits of Dominican Republic downy mildew-resistant watermelon strains.

[1]Formerly at the Watermelon and Grape Investigations Laboratory, Leesburg, Florida; now at the Department of Botany, Mississippi State College, State College, Mississippi.

In contrast, the native or "wild" melons of the Dominican Republic grow luxuriantly with little or no culture or attention. They resist attacks by aphids, and are said not to be attacked by a disease which kills the foliage of commercial melons. The Dominican Republic watermelon strains are susceptible to anthracnose, Colletotrichum lagenarium (Pass.) Ell. and Hals., and to gummy-stem blight, Mycosphaerella melonis (Pass.) Chiu and J. C. Walker, when artificially inoculated. The quality of these "wild" melons is poor and unpalatable by comparison with northern melon varieties. Knowing of the program under way in Florida to develop disease resistance in the watermelon, Mr. Hamor made collections of seeds from native Dominican Republic watermelons. Seeds from 9 melons were airmailed from the Dominican Republic to Leesburg at the suggestion of Doctor Schneck.

The seeds were planted at Leesburg in 1948 on Fusarium wilt-infested land. In the warm soils of the tropics, the Fusarium wilt fungus that attacks watermelon, Fusarium oxysporum Schlecht. f. niveum (E. F. Sm.) Snyder and Hansen, usually is not of great consequence. Therefore, it was considered that the "wild" melons would not be resistant to wilt; this later proved to be so. Downy mildew, Pseudoperonospora cubensis (Berk. and Curt.) Rostow., was present in the 1948 plots. By the middle of the growing season it was obvious that the Dominican Republic melon strains possessed a useful degree of resistance to this disease. Variation in the resistance to mildew varied within lines as well as between the 9 lines. Melons were saved from plants whose foliage was resistant. Self-pollinations were attempted, but all vines bearing selfed melons died with wilt; only open-pollinated melons were saved.

The "wild" melons are smaller than commercial lines and usually weigh less than 15 pounds. The internal quality is poor and the flesh is stringy and mealy with a flat taste; the center of the fruit consists of a large cavity partly filled with a slightly sweet liquid. The rind color may be solid dark green, a dark to medium green with a narrow stripe of lighter green running the length of the melon, or a light green with a broader stripe of darker green; the texture of the rind is tough. Shape may be cylindrical, semi-round to round, or intermediate between long and round usually called "short" or "medium". Seed color may be a solid black, stippled black, or solid reddish brown.

Seeds from 14 open pollinated melons were planted on wilt-infested land in 1949. There were 10 hills planted from each melon, with 2 vines per hill. Selfed melons, 1 to 4 in number, were obtained from all 14 lines. Downy mildew vigorously attacked unsprayed commercial melons growing near the Dominican Republic strains. The West Indian strains, also unsprayed, continued fairly free from the mildew for a number of days and demonstrated once again the presence of a useful resistance to this disease. As the Dominican strains mature their melons, the foliage slowly succumbs to attack by the mildew fungus. None of the strains are immune. Twenty-eight selfed melons, borne on plants showing the greatest apparent resistance to downy mildew, were saved.

The 28 inbred lines were planted in 1950 on wilt-infested land to further observe their behavior towards downy mildew. No fungicide sprays or dusts were applied to the Dominican Republic strains or to a number of commercial varieties growing alongside. The commercial lines, all resistant to wilt and many resistant also to anthracnose, were killed by mildew before their fruits matured. The Dominican Republic strains again showed high resistance. Twelve strains seemed to be more resistant than the others. These 12 have been used as parents in crosses with wilt- and/or anthracnose-resistant watermelons to develop melons resistant to the three diseases. Progeny are now in the F_2 generation.

The 12 strains are briefly described below, and representative melons are shown in Figure 1.

Strain No.	Shape	Color of rind	Markings of rind	Color of seed
2760-1-01	Medium	Dark green	None	Black
-1-02	Medium	Dark green	None	Black
-1-03	Medium	Dark green	None	Black
3160-3-03	Medium	Light green	Broad stripe of darker green	Black
3300-1-01	Long	Dark green	None	Black
-1-02	Long	Dark green	None	Black
-2-01	Medium	Medium green	Faint stripe of darker green	Black
03-01	Short	Medium green	Faint stripe of darker green	Black

Strain No.	Shape	Color of rind	Markings of rind	Color of seed
3300-(Cont)				
-5-01	Long	Dark green	None	Black
3320-1-03	Almost round	Dark green	None	Reddish brown
-4-01	Almost round	Medium green	Broad stripe of darker green	Reddish brown
-4-03	Almost round	Dark green	None	Reddish brown

WATERMELON AND GRAPE INVESTIGATIONS LABORATORY, FLORIDA AGRICULTURAL EXPERIMENT STATIONS, LEESBURG, FLORIDA

INTERNAL DAMAGE TO CELERY IN FLORIDA CAUSED APPARENTLY BY WINDS OF HURRICANE FORCE

Frank V. Stevenson

An abnormal growth of celery which had been subjected to winds of hurricane force during October 17 and 18 was noted during the harvesting period in the Everglades area this past season. This condition was first noted early in December when September set plants were cut to check for maturity. There were no apparent outward symptoms except for a slight stunting of the plants. When these stunted plants were cut they were found to be hollow in the butt of the stalk. In many cases it appeared merely that the pith was lacking, in others there was a definite corking over and often adventitious buds had formed in this corked area and new growing points had filled the hollow area (Figure 1). There was no evidence of rot. Pieces of abnormal stalks placed in a moist chamber did not break down nor did any mold growth appear on them over an extended period.

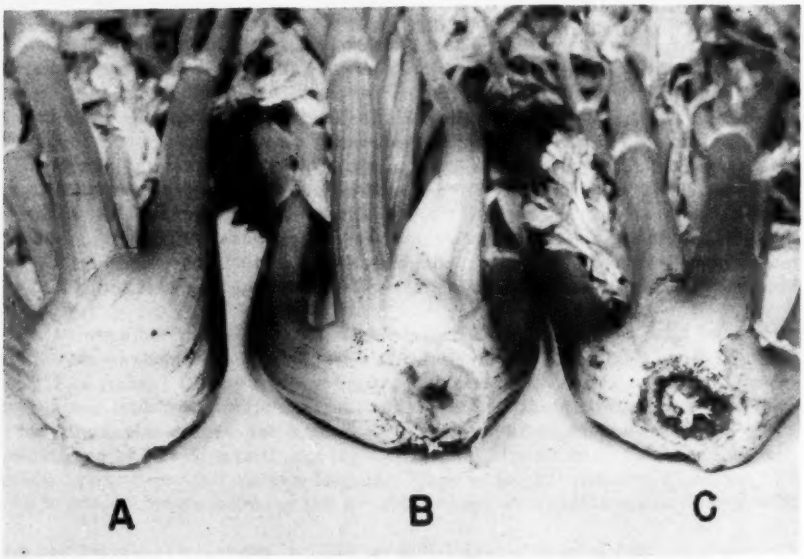

FIGURE 1. Celery stalks from fields wherein damage was correlated with the occurrence of the conditions of high wind and rainfall during a hurricane showing: A. Normal plant. B. Hollow stalk. C. Hollow stalk showing brown corking over and new growing points.

On the farm on which this condition was first noted, transplanting of 80 acres had begun the first week in September and had progressed continuously so that there were plants of all ages in the ground at the time of the storm. Harvesting would normally have been started during the first week in December, however the hurricane and three heavy freezes which occurred the last week in November and the first and third weeks of December severely damaged the plants and retarded development of the celery so that harvesting was not begun until the first week in January. After the harvest was completed, it was clear that the hollow condition was not prevalent in the celery which was set after the storm. There did not seem to be any correlation between freezing and the condition described above as celery plants set after the hurricane were also frozen but did not develop the hollow condition.

A survey of the celery growing area south of Lake Okeechobee was made during the middle of February. This showed the incidence of the condition decreased markedly from east to west toward the eyespot of the storm. The celery which had been set for the longest period before the storm showed the most severe damage with the incidence in the region of highest wind running as high as 40 percent. This percentage dropped steadily until all celery which had survived the hurricane had been cut. All processors of celery reported a sharp drop of this condition in celery plants set after the hurricane.

UNIVERSITY OF FLORIDA, EVERGLADES EXPERIMENT STATION, BELLE GLADE, FLORIDA

PATHOGENICITY OF SOME PLANT-PARASITIC NEMATODES FROM FLORIDA SOILS. II. REACTION OF CELERY SEEDLINGS TO A PLANT-PARASITIC NEMATODE COMPLEX

B. F. Lownsbery and A. C. Tarjan

Christie and Perry (1) have reported serious damage to Florida vegetable crops by a Trichodorus species resembling Trichodorus primitivus De Man, but designated Trichodorus sp. pending further study. These authors have described the symptoms associated with Trichodorus infection, and the manner in which Trichodorus feeds on its host.

Inoculum containing Trichodorus was kindly supplied by Christie and Perry and its effect on two month old celery seedlings [1] was tested. Seedlings were grown in five-inch pots of an autoclaved mixture consisting of two-thirds sand and one-third soil.

Twenty cc. of agitated nematode suspension containing approximately 600 Trichodorus sp. were pipetted around the roots of each of ten replicate plants. The infested spot was immediately covered with a light layer of the autoclaved soil. These inoculated plants as well as ten uninoculated controls were placed in a randomized arrangement on a greenhouse bench and watered.

The inoculum which each of the infested plants received contained in addition to 600 Trichodorus, approximately the following numbers of other nematodes: Dorylaimus - 140, Hemicycliophora - 90, Mononchus - 90, Rhabditis - 65, Diplogaster - 50, Ditylenchus - 45, Acrobeles - 40, Hoplolaimus - 20, Cephalobidae - 15, Aphelenchoides - 5, and Tripyla - 5.

After the celery seedlings had grown fifteen weeks at an average temperature of 75° F., their fresh weights were obtained (Table 1).

Table 1. Fresh weight in grams of celery seedlings grown in autoclaved soils and in autoclaved soil infested with a nematode complex from Florida soils.

	Autoclaved [a]	Autoclaved and infested [a]	t value
Total plant	94.2 ± 8.7	61.2 ± 3.2	3.6 [b]
Top	24.3 ± 1.4	20.3 ± 1.3	2.0 [c]
Root	69.9 ± 8.5	40.9 ± 2.1	3.3 [b]

[a] Mean of ten replicates with standard error.
[b] Signigicant at the 1% level.
[c] Not significant.

Infestation of the soil with the nematode complex produced significantly smaller plants because of reduction of the root system. These results were not as striking as those obtained by Tarjan, Lownsbery, and Hawley (4) who found that seven-week-old celery seedlings grown in soil infested with Dolichodorus heterocephalus showed significant decreases in fresh weight within seven and one half weeks as compared to control plants grown in uninfested soil.

The kinds and numbers of nematodes present in the pots when the plants were weighed were determined using the Cobb (2) screening-gravity method followed by an aliquoting procedure (3). Screening of soil from a few control pots showed no nematodes present. An average of 2880 Trichodorus, 2420 Dorylaimus (principally D. subtilis Thorne and Swanger), 1010 Hemicycliophora, 270 Dolichodorus heterocephalus Cobb, 40 Cephalobidae, 30 Mononchus, and 10 Diplogaster were recovered from inoculated plants. It is believed that Dolichodorus was present in the original inoculum in numbers too small to be detected by the aliquoting method employed. The above figures do not represent the mean total per pot, but only the mean recovery per pot. Complete recovery is not possible by the method used.

Although Trichodorus sp., Hemicycliophora sp., Dolichodorus heterocephalus and Dorylaimus subtilis multiplied during the experiment, a causal relationship between increase of any one species and reduction in celery root growth has not been established. The test is reported as further indication of the possible importance of these little-studied nematodes.

[1] U. S. Department of Agriculture. Seed Testing Laboratory #301307.

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DIVISION OF NEMATOLOGY

VALUE OF INDEX PLANTS FOR DETECTING DAHLIA VIRUSES

Philip Brierley

Upon the discovery that Zinnia elegans and Verbesina encelioides express well-defined symptoms when affected with dahlia mosaic (1), it became of interest to learn whether plants of these species were sufficiently sensitive to serve as index plants for detecting the dahlia mosaic virus. Through the courtesy of Dr. R. S. Holmes, an amateur dahlia grower of Falls Church, Virginia, in January 1951, we obtained roots of 12 varieties, listed in Table 1, that he had considered healthy in the field in 1950 and also roots of 6 unidentified dahlia sorts that had been discarded as diseased or inferior by one of Dr. Holmes' neighbors. We planted these in pots in a greenhouse in January 1951 and maintained them in active growth.

The first index trials were made by manual inoculation on March 2, when the dahlias were 20 to 68 cm. tall. All dahlias were topped on March 23 to induce fresh vegetative growth. A second series of index trials were made on April 17. Turkish tobacco var. Samsun, was included in most of these tests to detect cucumber mosaic and tomato spotted wilt viruses if present. The symptoms expressed by the dahlias themselves were noted at intervals for comparison with the results of indexing. The results of the two series of index trials are summarized in Table 1.

In the first series Golden Gem Midget zinnia plants were used throughout; Verbesina and tobacco were included in selected tests. In zinnia, dahlia mosaic virus produced dwarfing with marked downward curling of leaves; cucumber mosaic virus induced slight transitory curling and vein clearing. The reactions of tobacco to cucumber mosaic virus varied, some strains causing white primary lesions and others yellowish mottling only. In Verbesina dahlia mosaic virus induced vein clearing in about 10 days followed by prominent vein mosaic with crinkling and downward curling of leaves. Cucumber mosaic symptoms in Verbesina were much milder, consisting of diffuse mottling with only occasional vein clearing and no leaf distortion. Cucumber mosaic virus also produced pale round spot primary lesions in Verbesina. In this series of tests all three test species reacted clearly, zinnia and Verbesina proving about equally sensitive to dahlia mosaic virus when tested in parallel. On April 6, a month after these index tests were made, all the zinnias were inoculated with Price's tester strain of cucumber mosaic virus. Necrotic primary spots developed freely on all zinnias except those previously affected with cucumber mosaic.

In the second series of tests, made on April 17, the brown discoloration of dahlia sap, determined by Cornuet et al. (2) to be due to tannins, was much more in evidence. The extracted sap browned promptly and stained the hands. Perhaps related to this change was a general failure of zinnia to respond in this series while Verbesina and tobacco responded as well as in the earlier tests. Dahlia mosaic virus was isolated in typical form from Jersey Beauty which had been symptomless in early stages of growth and which gave a negative test in the earlier series. On inoculation from King David, which showed a mild inconspicuous vein banding, a mild vein mosaic developed in Verbesina. A similar mild vein mosaic in Discard 4 was detected in zinnia in the first series and also in Verbesina in a separate test made in June, but not in the second series of index trials. In other respects the two series of tests showed good agreement.

Under favorable greenhouse conditions dahlia mosaic symptoms are usually clearly defined in dahlia. Although both zinnia and Verbesina proved fairly sensitive to dahlia mosaic virus in early season indexing, and Verbesina in later indexing also, the diseases detected were always recognizable in the source plants. Indexing thus serves to confirm direct diagnosis and aids in determining which virus is present. The absence of tomato spotted wilt from this limited sample of dahlias prevented the evaluation of test plants for detecting this virus.

The presence of cucumber mosaic virus in three of 18 dahlias indexed is of special interest. This virus has long been recognized as common in European dahlias, but we have failed repeatedly to induce the disease in dahlia, as reported earlier (1). The strains of cucumber mosaic virus isolated here were not unusual in expression in tobacco. One of these strains inoculated into Creole Easter lilies induced necrotic fleck, a response characteristic of cucumber mosaic virus strains from other sources. When two strains isolated from dahlia were inoculated into a dahlia seedling clon, selected from Unwin's hybrids and mentioned in an earlier report (1), no symptoms appeared and the cucumber mosaic strains could not be reisolated. Evidently this seedling clon and possibly other miniature dahlias used in our earlier tests are immune from or highly resistant to cucumber mosaic. The large-flowered dahlias found naturally affected with cucumber mosiac expressed mild diffuse mottling, not a vein mosaic, with little or no distortion of the leaves. In the variety Ogden Reed a mild flower break was recognizable. Judging from the effects in these three varieties under greenhouse conditions, cucumber mosaic is not appreciably damaging to dahlias. Dahlias evidently may carry this virus with inconspicuous symptoms and may thus

Table 1. Virus content of dahlias determined by indexing.

Source	Symptoms in dahlias	Index (March 2) on-			Index (April 17) on-			Diagnosis
		Zinnia	Verbesina	Tobacco	Zinnia	Verbesina	Tobacco	
Edgar Guest	Vein mosaic (mild and late)	0/5	--	--	0/4	0/4	0/4	Mild dahlia mosaic (?)
Glory	Vein mosaic (mild)	0/5	--	--	0/4	0/4	0/4	Mild dahlia mosaic (?)
Jane Cowl	Healthy	0/5	--	--	0/4	0/4	0/4	Healthy
Jersey Beauty	Vein mosaic (late)	0/5	0/5	--	0/4	2/4	0/4	Dahlia mosaic
Kelvin	Leaf roll; obscure mottle	3/5	--	--	1/4	4/4	3/4	Cucumber mosaic
King David	Vein mosaic (mild)	0/5	--	0/5	0/4	1/4	0/4	Mild dahlia mosaic
Kirsten Flagstad	Healthy	0/5	--	0/4	0/4	0/4	0/4	Healthy
Mme. X	Vein mosaic	5/5	4/5	--	0/4	3/4	0/4	Dahlia mosiac
Murphy's Masterpiece	Healthy	0/5	--	--	0/4	0/4	0/4	Healthy
Ogden Reed	Diffuse mottling	3/5	--	5/5	1/4	2/4	4/4	Cucumber mosaic
Robert Scott	Healthy	0/5	--	--	0/4	0/4	0/4	Healthy
Seal's California	Diffuse mottling	5/5	--	4/4	1/4	4/4	4/4	Cucumber mosaic
Discard 1	Vein mosaic	4/5	5/5	0/5	--	--	--	Dahlia mosaic
Discard 2	Vein mosaic	3/5	--	--	0/4	2/4	0/4	Dahlia mosaic
Discard 3	Vein mosaic	2/5	5/5	0/5	--	--	--	Dahlia mosaic
Discard 4	Vein mosaic (mild)	2/5	--	--	0/4	0/4	0/4	Mild dahlia mosaic
Discard 5	Vein mosaic	2/5	4/5	0/5	--	--	--	Dahlia mosaic
Discard 6	Healthy	0/5	--	--	0/4	0/4	0/4	Healthy
Seedling stock-dahlia mosaic	Vein mosaic	3/5	1/5	--	--	--	--	Dahlia mosaic
Jersey Beauty-dahlia mosaic	Vein mosaic	5/5	3/5	--	0/4	3/4	0/4	Dahlia mosaic

serve as unsuspected sources of cucumber mosaic.

The distribution of these viruses in plants furnished as "healthy" or "discarded" by amateur growers is also of interest. Apparently cucumber mosaic and the mild form of dahlia mosaic go unnoticed in the garden. Jersey Beauty, a well-known variety, tolerant of dahlia mosaic and growing vigorously in spite of this disease, was also accepted as healthy. The one plant of Mme. X which expressed typical dahlia mosaic from early stages of growth onward probably was infected in the garden late in 1950, inasmuch as late season infections that first express symptoms in the following season are common in dahlias. Four of the six discards showed typical severe dahlia mosaic but the one that showed mild dahlia mosaic and the one healthy plant were evidently discarded for some reason other than virus infection. Of the five varieties that were consistently normal in appearance, at least three, Jane Cowl, Murphy's Masterpiece, and Robert Scott, have been in the trade for more than twenty years.

The mild vein mosaic virus tentatively considered a strain of dahlia mosaic virus was isolated from two varieties, King David and Discard 4, and apparently expressed in two others, Edgar Guest and Glory, from which it has not yet been isolated. Symptoms in the dahlias are mild vein banding, irregularly expressed in young leaves, with no distortion of the leaf surface. These symptoms appeared in early stages of growth in three varieties but in Edgar Guest they were first evident June 30 after five months' growth. The mild virus is somewhat difficult to isolate in Verbesina, in which it is expressed as a mild vein banding with no distortion of the leaf surface. Infected Verbesina expressed no stronger symptoms when held for two months. In two serial subinoculations in Verbesina the mild vein mosaic was constant in expression. Attempts to infect tobacco were unsuccessful.

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DIVISION OF ORNAMENTAL PLANT CROPS AND DISEASES

CONTROL OF TAR SPOT OF HOLLY (ILEX) BY SPRAYING IN SOUTH GEORGIA

John R. Cole

Tar spot, caused by Phacidium curtisii, is responsible for considerable damage to holly in south Georgia during years of excessive rainfall. This fungus attacks both foliage and berries (Figures 1 and 2), causing unsightly spots as well as considerable injury to the plants. Since holly is used primarily for Christmas decorations, the unsightly appearance of the disease spots on either the foliage or the berries reduces materially the value of the crop.

One grower of approximately 150 acres of holly (Howard variety) in the vicinity of Albany, Georgia, asked the assistance of the writer in controlling tar spot early in 1949. He had not detected any serious trouble from this disease until 1947 and 1948 when excessive rainfall, together with crowding of the trees, increased its incidence. At that time tar spot caused so much damage to both foliage and berries that a large percentage of the holly was unsalable.

The writer set up a series of experiments, including both sanitation and spraying to control this disease. These tests were conducted over a two-year period.

The sanitary measures consisted of eliminating some of the crowded trees, removing the lower limbs, from the ground to a height of about 3 feet, on the trees that were left, and harrowing the orchard to turn under old leaves only when the ground was moist, to avoid scattering dust particles that might carry the spores to new foliage which they might infect.

Spray materials applied with a hydraulic machine (Figure 3) included bordeaux mixture, ziram (zinc dimethyl dithiocarbamate), and Phygon XL (2, 3-dichloro-1, 4-naphthoquinone) as indicated in Table 1.

The table shows that sanitary measures (preventing the crowding of trees, removing lower branches, and turning under diseased leaves when the ground is moist) are important in controlling tar spot. In addition the spraying of the trees with either bordeaux mixture alone or bordeaux mixture followed by Phygon XL will give commercial control of the disease. However, bordeaux mixture applied late in the season deposits an objectional residue. For this reason it would appear to be better to use bordeaux mixture for the early applications and Phygon XL for the later applications. Phygon XL for all applications probably would prove to be satisfactory.

FIGURE 1. Foliage of Howard variety holly (unsprayed) infected with the tar spot fungus (Phacidium curtisii), from the Van Cise Orchard, Albany, Georgia.

FIGURE 2. Berries of Howard variety holly (unsprayed) infected with the tar spot fungus (Phacidium curtisii), from the Van Cise Orchard, Albany, Georgia.

FIGURE 3. Spraying with Phygon XL to control tar spot, caused by Phacidium curtisii, on Howard variety holly, Van Cise Orchard, Albany, Georgia.

Table 1. Influence of sanitation and fungicides applied to holly trees to control tar spot, caused by Phacidium curtisii, Van Cise Orchard, Albany, Georgia, 1949 and 1950. [1]

Year, method, treatment	Date of application or treatment ---	Percentage leaf and berry infections	Remarks
1949			
Sanitation [2]	January, February, March, and April	75	Fewer diseased spots per leaf than on unsprayed check.
Spraying:			
4-1-100 bordeaux mixture	April 15		Severe burning of flowers.
"	May 1		No burning of flowers.
"	June 28	20	No burning of flowers. Infected leaves not seriously injured. Residue on foliage and berries.
4-1-100 bordeaux mixture	April 15		Severe burning of flowers.
Ziram, 2-100	May 1 and 2		
"	June 28	30	Not quite as effective as bordeaux mixture alone. Some residue.
4-1-100 bordeaux mixture	April 15		Severe burning of flowers.
Phygon XL, 1-100	May 1 and 2		
"	June 28	20	Same control as bordeaux mixture. No residue on foliage or berries.
Check, no spray		100	Many spots on both leaves and berries creating an unsightly appearance and making holly unsalable.
1950			
Sanitation [2]	January, February, March and April	66	The percentages of infections were slightly less than in 1949, probably because of less inoculum as a result of previous year's treatments.
4-1-100 bordeaux mixture	May 8, July 6	16	Probably accumulated results of previous year's treatment. Residue on foliage objectionable.
4-1-100 bordeaux mixture	May 8		
Phygon XL, 1-100	July 6	18	Probably accumulated results of previous year's treatment.
Check, no spray		100	All leaves and berries infected but fewer spots than in 1949. The weather was no doubt an important factor in this reduction since there was a rainfall deficiency of 15 inches at this location in 1950.

[1] Ten trees in each treatment.
[2] See text.

BUREAU OF PLANT INDUSTRY, SOILS, AND AGRICULTURAL ENGINEERING, U. S. PECAN FIELD STATION, ALBANY, GEORGIA

PREVENTING DECOMPOSITION IN SPRAYS CONTAINING DITHIOCARBAMATES WITH COPPER

Donald E. H. Frear and R. S. Kirby

For the control of certain diseases such as anthracnose, late blight, etc., it is frequently desirable to combine ziram with basic copper sulfate (fixed copper). It was found that such a combination underwent a chemical reaction, resulting in the decomposition of the components. This reaction takes place within a few minutes after mixing, and is evident by a color change from blue to brown in the mixture.

After trying a number of combinations, it was discovered that the addition of skimmed milk powder to the spray mixture effectively prevented the decomposition reaction. Varying amounts of the dried milk powder were tested, and it was found that one-half pound per 100 gallons of finished spray was sufficient when the mixture contained 1 pound ziram, plus 2 to 4 pounds Tribasic copper sulfate. It appeared that the skimmed milk powder was most effective in preventing decomposition when added to the water in the spray tank with agitation before the other ingredients.

The same favorable effect was noted in combinations of basic copper sulfate, and ferbam. Calcium caseinate does not prevent the decomposition reaction.

PENNSYLVANIA STATE COLLEGE, STATE COLLEGE, PENNSYLVANIA

VARIEGATED SIDA RHOMBIFOLIA IN CENTRAL AMERICA

H. H. Thornberry and H. W. Anderson

Variegation of the foliage of Sida rhombifolia L. was observed and collected in Central America by H. W. Anderson during March, April and May 1951. Since the variegation is suggestive of the symptoms of abutilon mosaic in abutilon caused by abutilon mosaic virus (Marmor abutilon, Holmes, 1939), the literature was consulted to determine whether this plant has been reported to be a host of this virus. Since the search yielded negative results, this note is presented to record the observations on this variegation.

This variegation is thought to be symptoms of abutilon mosaic virus since variegated plants were observed in all areas in which the healthy plants were noted and also since two species of Sida (S. mollis Herb. and S. napaea Cav.) are known to be susceptible to this virus.

The variegation was observed in Costa Rica, Guatemala, Honduras, and Mexico. Specimens of the dried material collected from Tequisate, Guatemala were identified by Professor G. N. Jones, Curator of Herbarium, University of Illinois and the specimens deposited in this Herbarium.

UNIVERSITY OF ILLINOIS, URBANA

A PHYLLOSTICTA LEAF-SPOT ON BURFORD HOLLY IN GEORGIA

Charles H. Driver

The first disease to be reported for Burford holly (Ilex cornuta var. burfordi DeFrance) is a Phyllosticta leaf-spot. Original specimens were collected in June 1949, however, in June 1950 the disease was generally noticeable throughout northest Atlanta. The leaf-spot is usually terminal or marginal, covering about one-third or less of the leaf surface and measuring 1-4 cm. in diameter. The infected area is whitish and later reddish on the upper surface and slightly visible on the under surface. Numerous dark colored pycnidia occur at first in concentric lines along the margin of the young spot and later over the entire infected area (Fig. 1). The pycnidia are restricted to the upper side of the leaf and measure up to 160 microns in diameter. The spores are numerous, ellipsoid, and variable in size measuring 2-3 x 6-8 microns. The organism producing the above symptoms was determined to be Phyllosticta Haynaldi Sacc. & Roum.

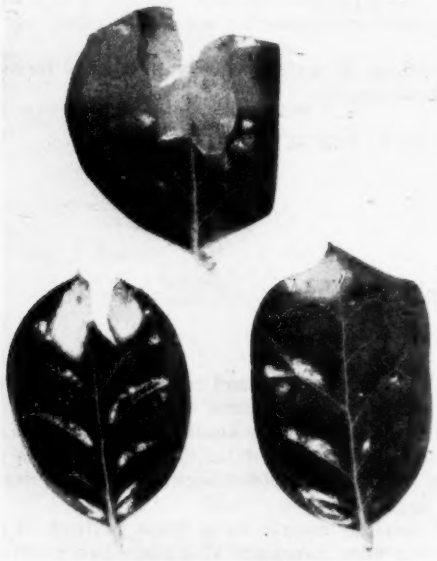

FIGURE 1. Developing leaf spot by Phyllosticta haynaldi on the leaves of Burford holly.

This species of Phyllosticta has not been previously reported, to the author's knowledge, on a cultivated species of holly in the United States. Saccardo (1) first reported this species of fungus on Ilex aquifolium L. in France. Weiss (2) recorded this species on Ilex verticillata (L.) A. Gray, from West Virginia.

P. haynaldi differs slightly from P. ilicicola (Cke. & Ell.) Ell. & Ev. in its smaller spores and concentric arrangement of the pycnidia on the perimeter of the developing infected areas.

The perfect stage of this fungus has not been determined, although the author has collected the imperfect stage throughout an entire year.

Specimens and photographs of this disease have been deposited in the following herbaria under C.H.D. #632: University of Georgia, Department of Plant Pathology, Athens, Georgia, and Division of Mycology and Disease Survey, U. S. Department of Agriculture, Beltsville, Maryland.

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EMORY UNIVERSITY, EMORY UNIVERSITY, GEORGIA

AN ANTHRACNOSE OF BITTERSWEET IN MARYLAND[1]

Anna E. Jenkins and R. A. Jehle

Bittersweet (Celastrus scandens L.) growing wild is common in Maryland, often trailing over fences including the so-called "stake and rider" (rail) fences, hedge-rows and other supports. At Chewsville, Washington County, in summer, 1947, passing near a fence over which bittersweet was climbing, attention was directed to prominent lesions on foliage and stems of this plant (Fig. 1). On another occasion the same symptoms were observed on wild bittersweet in the same general locality.

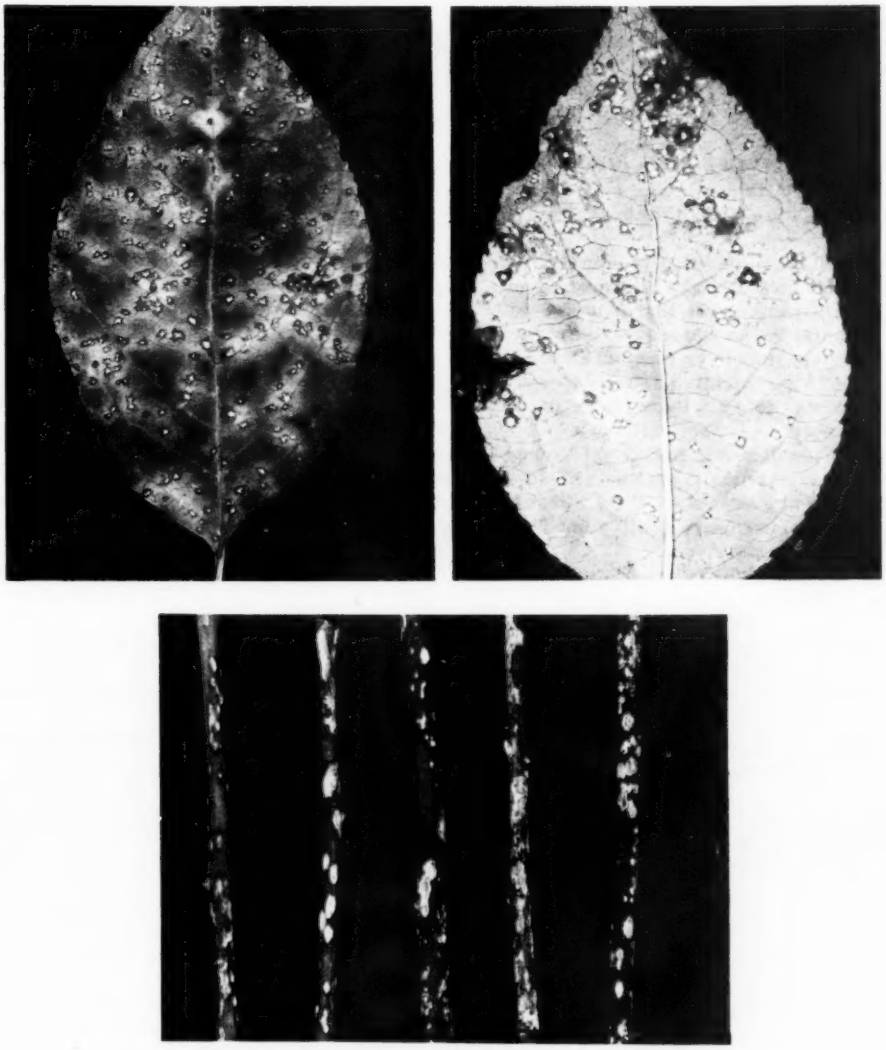

FIGURE 1. Marssonia thomasiana on bittersweet, Chewsville, Maryland August 29, 1947. X 2. Photograph by W. F. Jeffers.
A. upper leaf surface
B. lower leaf surface
C. stems

[1]Scientific Article No. A 335, Contribution No. 2302, Maryland Agricultural Experiment Station (Department of Botany).

Boothroyd[2] has reported his independent discovery (1948-and 1949) at Ithaca, New York, of what is certainly this same disease of bittersweet. Taxonomically, he found the pathogen to agree with Marssonina thomasiana (Sacc.) Magn., described on Evonymus atropurpurea. His attempts to obtain additional data on the history and distribution of the organism on bittersweet were negative. We are gratified, therefore, to be able to supply the above record from Maryland. The fungus is present in abundance on the specimen cited.

DIVISION OF MYCOLOGY AND DISEASE SURVEY, U. S. BUREAU OF PLANT INDUSTRY, SOILS, AND AGRICULTURAL ENGINEERING, AND DIVISION OF PLANT PATHOLOGY, DEPARTMENT OF BOTANY, UNIVERSITY OF MARYLAND

TWO INSTANCES OF WILD VIOLETS RECENTLY INFECTED BY SPHACELOMA VIOLAE[1]

R. A. Jehle and Anna E. Jenkins

Violet (Viola), like grape (Vitis), furnishes an example of a plant that is extremely vulnerable to attack by its particular spot anthracnose pathogen, in this case Sphaceloma violae Jenkins (2: 7). Specifically, the disease caused by this organism is called "violet and pansy scab."

Wild violets are unusually common throughout Maryland and often appear spontaneously in sufficient numbers to make a ground cover. Inspections for the scab in Maryland during the past several years have shown that it is widely distributed on wild violets in the State (1, 3). During the many instances in which the disease was observed there was no clue as to when a particular group of violets may have been infected, that is, with the following exception: In 1945 a certain patch of wild violet plants at Muddy Creek Falls, Garrett County, was thoroughly inspected for scab. None was found. Upon revisiting this recreation area last July, however, unmistakable scab lesions were present, although on only a few plants near a picnic table. The disease had previously been detected in Garrett County in two instances (cf. 1: 195 and 198).

A similar instance to that described above is afforded in the case of wild violets growing spontaneously in a lawn near the Smithsonian Institution, Washington, D. C. Here, the rather inconspicuous plants were healthy until a year or so ago, when they were discovered to be abundantly affected by the scab.

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DIVISION OF PLANT PATHOLOGY, DEPARTMENT OF BOTANY, UNIVERSITY OF MARYLAND AND DIVISION OF MYCOLOGY AND DISEASE SURVEY, U. S. BUREAU OF PLANT INDUSTRY, SOILS, AND AGRICULTURAL ENGINEERING

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[2]Boothroyd, C. W. A new leaf spot of Celastrus scandens L., the climbing bittersweet. Mycologia 43: 373-375. 1951.

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[1]Scientific Article No. A 334. Contribution No. 2301 of the Maryland Agricultural Experiment Station (Department of Botany).

INTERCEPTIONS OF SPHACELOMA PUNICAE FROM FOREIGN SOURCES

Anna E. Jenkins and Alice J. Watson

Several interceptions of Sphaceloma punicae Bitanc. & Jenkins (1: 163) on fruit of pomegranate (Punica granatum L.) have now been made (Table 1). Two from border ports in Arizona have

Table 1. Interceptions of Sphaceloma punicae from Mexico and Italy.

Border port	Date	Inspector	Interception number	Determined or verified by	Disposition of specimens and accession numbers	
(Ex Mexico)					USM [1]	IB [2]
Douglas, Ariz.	Oct. 2, 1945	W. R. Shin	Douglas 8078	Det. A. E. J. & A. A. Bitancourt	90227	5104
Nogales, Ariz.	Oct. 6, 1945	W. J. Ehringer	Nogales 63242	Det. A. E. J. & A. A. Bitancourt	90252	5105
Laredo, Tex.	July 25, 1946	E. E. Sims	Laredo 40295	Det. A. E. J & A. J. W.	91000	5658
Nogales, Ariz.	Oct. 3, 1946	J. A. Lindsay	Nogales 65158	Det. A. J. W., Ver. A. E. J.	91001	----
Eagle Pass, Ariz.	Sept. 3, 1949	E. A. Peck	Eagle Pass 10386	Det. A. J. W.	91002	----
Nogales, Ariz. (Ex Italy)	Oct. 5, 1949	J. A. Lindsay	Nogales 69974	Det. Lindsay, Ver. A. E. J. & A. J. W.	90896	5617
New York, N. Y.	Dec. 23, 1949	A. F. Bednar	N. Y. 108866	Det. W. S. Fields Ver. A. E. J. & A. J. W.	90926	5691

[1] USM = Mycological Collections, Bureau of Plant Industry, Soils, and Agricultural Engineering.
[2] IB = Herbarium, Secção de Fitopatologia do Instituto Biologico, São Paulo, Brazil.

already been recorded (5: 62). Laredo 40295 was erroneously listed as Cercospora lythracearum Heald and Wolf (5: 55). These Mexican interceptions are significant in that they constitute the first known record of S. punicae in that country, as well as in North America. Lesions of the anthracnose caused by this pathogen are abundant on the intercepted fruit. Altogether, the data presented afford evidence that the organism is well established in Mexico. As a result of Jenkins' (2) review and interpretation of European literature bearing on Elsinoë piri (Woronich.) Jenkins (2: 296) on apple (Malus sylvestris Mill.) and pear (Pyrus communis L.) it became apparent that Montemartini's (3) report of Hadrotrichum populi Sacc. as a pathogen producing a fruit spot on pomegranate in Italy actually refers to a Sphaceloma. Bitancourt's subsequent search for this Sphaceloma on pomegranate in South America resulting in his finding it on leaves. On this basis it was described as a new species. New York 108866 not only constitutes the first available record from Italy, but also confirms Montemartini's assertion that affected fruit present "un aspetto poco commerciable" (Fig. 1). Thirumalachar's (4) discovery of the pathogen at Bangalore, India, has the significance of tracing it at least to the country and continent where the pomegranate is native. Further pertinent facts relative to the history and distribution of this notable suscept were offered by Bitancourt and Jenkins (1: 149-150) as a setting for the description of S. punicae.

FIGURE 1. Sphaceloma punicae on pomegranate (New York 108866). X 1. Photograph by R. L. Taylor.

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MYCOLOGY AND DISEASE SURVEY, BUREAU OF PLANT INDUSTRY, SOILS, AND AGRICULTURAL ENGINEERING, AND BUREAU OF ENTOMOLOGY AND PLANT QUARANTINE.

INTERCEPTIONS OF FOREIGN SPHACELOMA PERSEAE OF PARTICULAR SIGNIFICANCE

Alice J. Watson and Anna E. Jenkins

"In general, fruit diseases are responsible for the largest amount of loss to the avocado growers in Florida." This statement is by Stevens (5), who added: "Under Florida conditions several diseases occur on avocado fruits. Those most commonly observed and widely distributed over the State are scab, Cercospora spot or blotch and black spot." Mechanical injury is common on avocado fruits, the same author stated, and is often confused with avocado scab. Essentially this same complex of diseases is represented at least in some parts of Mexico, according to the numerous interceptions of diseased ripe fruits from that country that have come to our attention. These fruits are of Popenoe's "Mexican type" (Blake 1); that is, they have a thin, soft skin. Because of the extreme perishability of the ripe fruit, only pieces of the dry peel showing whatever spotting may be present have been transmitted for mycological identification.

One of the most critical problems imposed in the case of these interceptions of ripe fruit has been the identification of the scab pathogen, Sphaceloma perseae Jenkins (3, also see 4), with a satisfactory degree of certainty. This situation led us on two occasions to attempt to culture the organism from what appeared to be definite examples of the scab (Table 1). A Sphaceloma with cultural growth entirely typical of S. perseae was recovered in each instance. Lesions on Laredo 46544 (Fig. 1, A) appear brown, but as viewed through a hand lens it is apparent that paler acervuli of the Sphaceloma are present. Their great abundance on most of the spots of Laredo 50817 (Fig. 1, B) imparts a gray cast to the lesions. This feature in the symptomatology of avocado scab has not been recorded previously, and inspectors stationed at

Table 1. Interceptions of Sphaceloma perseae from Mexico taken at the border port of Laredo, Texas.

Date	Inspector	Interception number	Determined or verified by	Disposition of specimen and accession number USM[1]
May 30, 1948	J. E. Ragsdale	Laredo 46544	Det. W. H. Wheeler ver. A.E.J. & A.J.W.	91006
January 21, 1951	T. P. Chapman	Laredo 50817	Det. A.E.J. & A.J.W.	90104

[1] USM = Mycological collections of the Bureau of Plant Industry, Soils, and Agricultural Engineering.

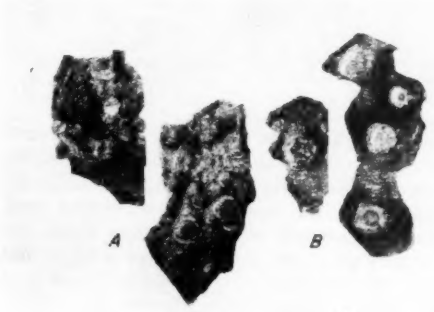

FIGURE 1. Sphaceloma perseae on dried bits of avocado skin, representing (A) Laredo 46544, and (B) Laredo 50817, X 1. Photograph by Lillian Guernsey.

Mexican border ports have been at a loss for a proper interpretation of what had come to be called gray spot. Jenkins' (2) original report of the Sphaceloma from Mexico was based on an interception from that country, where the avocado grows wild. We are again indebted to the border-port inspectors for their painstaking interceptions, on the basis of which the first isolations of the pathogen from that country have been made.

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OTHER NEW RECORDS OF PLANT DISEASE OCCURRENCE

PHYTOPHTHORA CACTORUM ON COWPEAS IN SOUTH CAROLINA

By G. M. Armstrong

A disease of cowpeas which I had not seen before was recently observed in a garden at Clemson, South Carolina. The symptoms agree with the description by J. L. Weimer[1] of the red stem canker of cowpea caused by Phytophthora cactorum. Platings on water agar produced a phycomycetous fungus with abundant oospores. The two rows of cowpeas were watered to get emergence in a dry soil. A shower occurred when the plants were 4 or 5 inches tall and the disease was noted a few days later. About 20 percent of the plants were infected and about 3 to 4 percent were killed. All the dead plants and some of the infected ones were removed at this time. Hot dry weather for the last two weeks has check the disease with only an occasional dead plant having been noted during this period.

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[1] Jour. Agr. Res. 78: 65-75. 1949.

THE OCCURRENCE OF RUST ON PEPPERMINT IN WESTERN ONTARIO

By J. W. Baxter

The uredial stage of mint rust, Puccinia menthae, was found on peppermint in western Ontario on July 7, 1951. Light to moderately heavy infection was observed in two fields near Thedford, which is approximately 35 miles northeast of Port Huron, Michigan. Although rust occurs commonly on spearmint in Michigan and Indiana, it has not been observed on peppermint in those States. The Ontario rust may have migrated westward from New York State, where rust has been known to occur on peppermint, or it may be a new race. It is possible that wild mint, Mentha arvensis, is susceptible to this race. A westward spread of the Ontario peppermint rust into Michigan, on wild mints or by other means, may eventually occur.

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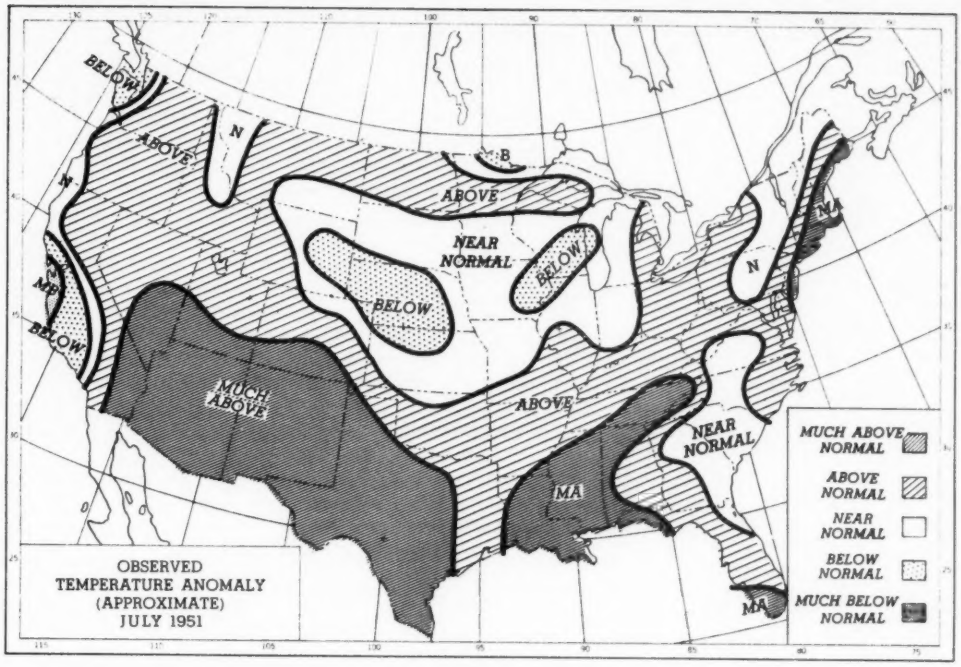

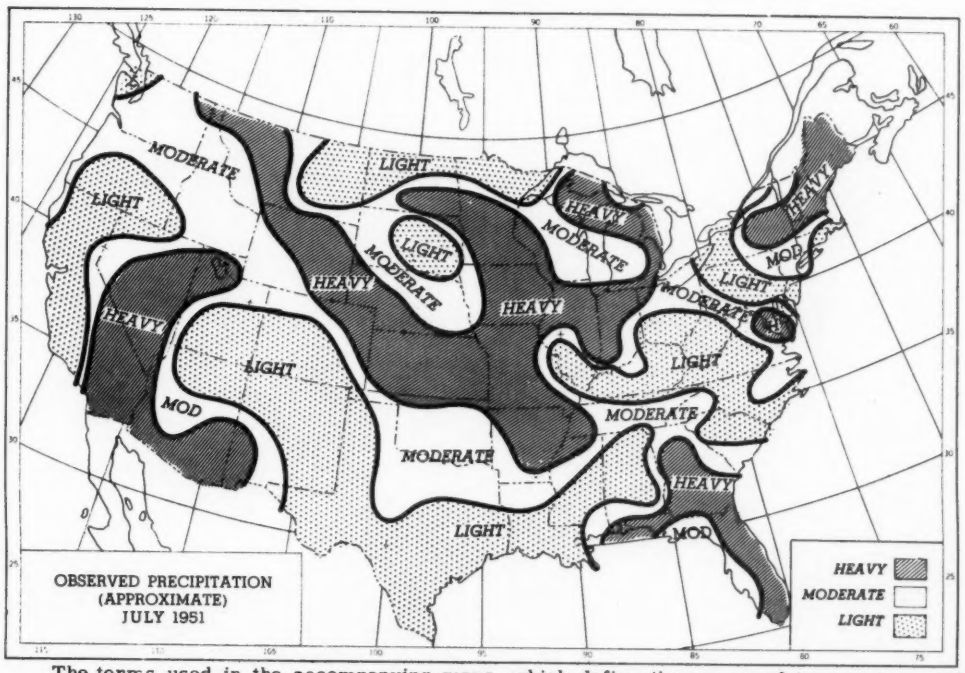

The terms used in the accompanying maps, which define the ranges of temperature and precipitation, are numerical class limits. These are based on a statistical analysis of past records through which is determined the normal frequency of occurrence of temperatures and precipitation at various times of the year for different locations. For temperature the classes above, below, and near normal are so defined that they each normally occur one-fourth of the time; much above and much below normal, one-eighth of the time. Precipitation is depicted in terms of light, moderate, and heavy, each class normally occurring one-third of the time and thereby having equal probability of occurrence. These maps graphically represent only the general trends and give the country's weather picture at a glance. For quantitative studies, where monthly mean temperatures and actual precipitation records are needed for a given time and place, other publications of the Weather Bureau should be consulted. P. R. M.